ATTACHMENT NOT INCLUDED

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

**MEMORANDUM**

Date: November 18, 1993

Subject: ACTION MEMORANDUM
Request for a Removal Action at Johnson Lumber Site, in Katy, Fort Bend County, Texas

To: Russell F. Rhoades
Director
Environmental Services Division (6E)

From: Warren Zehner
Senior On-Scene Coordinator
Removal/Sites Section (6E-ES)

Through: Charles A. Gazda
Chief
Emergency Response Branch (6E-E)

Site ID#: 6W

## I. PURPOSE

This memorandum is to request and document the verbal approval of Russell F. Rhoades, Director of the Environmental Services Division, for a Removal Action pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. § 9601 et. seq., at the Johnson Lumber Site, 541 Pin Oak Road, Katy, Fort Bend County, Texas. The proposed action involves the removal and secure on-site storage of the liquid and solid contaminants present on the Site, until arrangements for the final destruction of the contaminants can be secured by the Agency.

This action meets the criteria for initiating a removal action under Section 300.415 of the National Contingency Plan (NCP), 40 C.F.R. Section 300.415. This action is expected to require less than twelve months and $2,000,000 to complete.

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## II. SITE CONDITIONS AND BACKGROUND

CERCLIS ID: TXD988087573
Category of Removal: Classic Emergency

### A. Site Description

#### 1. Removal site evaluation

On March 23, 1993 the Emergency Response Branch (ERB) of the United States Environmental Protection Agency (EPA) was notified of conditions at a defunct lumber yard contaminated with wood preservation chemicals in Katy, Texas (the "Site") by the Consolidated Office Affairs Section of the Federal Deposit Insurance Corporation (FDIC). The FDIC involuntarily acquired this Site on May 4, 1989 when the Katy National Bank was declared insolvent. Although the FDIC conducted a limited removal of the visually contaminated soils on Site, post-removal sampling results from the FDIC contractor indicate that significant amounts of pentachlorophenol and associated chlorinated dibenzo-p-dioxins (CDDs) and dibenzofurans (CDFs) remain on the Site. The FDIC requested ERB assistance in abating the threats on this Site, on the aforementioned date (See Attachment 1).

Neither a Preliminary Assessment (PA) nor a Site Investigation (SI) has been conducted on this Site for the evaluation of potential inclusion on the National Priorities List (NPL). However, all data generated from this removal will be referred to the Superfund Site Assessment Section for its evaluation of the need for a PA or SI.

The key problems associated with this Site are: soils contaminated with elevated concentrations of pentachlorophenol and associated CDDs/CDFs on Site in the historic wood treating area, and elevated concentrations of the same chemicals in the soils of the adjoining Pin Oak Trailer Park.

#### 2. Physical location

The Site is located at 541 Pin Oak Road in Katy, Texas. It is composed of three tracts of the Jesse Thompson Survey, and is approximately 5.0 acres in size. The facility is fenced and bounded on the north by the Pin Oak Trailer Park, on the west by Odessa Kilpatrick Elementary School (inactive), on the south by a residential area and on the east by a vacant lot. Approximately 1000 people reside within one mile of the Site. There are no vulnerable or sensitive habitats or natural resource areas in the immediate proximity of the Site (Figures 1 & 2).

#### 3. Site characteristics

The facility has not been operational since the Katy National Bank foreclosed on the property in 1988. While operational (mid 1960s -





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mid 1980s) the facility operated as a full service lumber yard. It is unknown how long the pentachlorophenol treatment area was in operation on the Site. However, based on physical evidence present on the Site and FDIC documents provided to EPA, it appears that the wood treating area was in operation for several years and discharged a substantial quantity of wood treating solutions into the environment via surface soils.

**4. Release or threatened release into the environment of a hazardous substance, or pollutant or contaminant**

The principal contaminants of concern on this Site are pentachlorophenol and associated chlorinated phenolic by-products from the manufacturing process of pentachlorophenol that have been discharged into the surface soils both in and around the wood treating area on the Site and adjacent surface soils outside the physical boundaries of the Site. The pentachlorophenol solution meets the definitions of a hazardous substance as set forth by Section 101(14)(c) of CERCLA, 42 U.S.C. § 9601(14)(c), and further defined at 40 C.F.R. Section 302.4.

As stated above, strong physical evidence is present on the Site to indicate a historic release of the pentachlorophenol formulation into the environment. Analytical results from representative samples collected by the FDIC contractors and the Technical Assistance Team (TAT) contractors, from both on-site and off-site, document this historic release. While there is no active discharge of contaminants occurring from the Site, the previously discharged contaminants in the soils are subject to movement by wind and storm water run-off. There are no known potable water wells on the Site or adjacent properties that could potentially be affected by the aforementioned discharge or run-off.

**5. NPL status**

This site is not presently on the NPL.

**6. Maps, pictures, and other graphic representations**

The following is a listing and brief description of the attachments.

| | |
|---|---|
| Attachment 1. | FDIC referral letter |
| Figure 1. | Site Location Map (7.5 min. quad.) |
| Figure 2. | Site Sketch |
| Figure 3. | Sample Location Map |
| Table 1. | 2,3,7,8 TCDD Equiv. Calculations |
| Photo Sheets | Representative photographs of site conditions |

B. Other Actions to Date

1. Previous Actions

After obtaining the facility in 1989, through receivership of the Katy National Bank, the FDIC conducted a site inspection on the Johnson Lumber facility and noted several environmental problems associated with the Site. In 1990, the FDIC conducted a limited abatement action in the wood treating area by removing approximately 1000 gallons of pentachlorophenol solution from above and below ground storage tanks and by removing grossly contaminated (visual) soil in the area. In addition to the abatement actions in the wood treating area, FDIC also removed and clean-closed two underground petroleum storage tanks under Texas Water Commission (TWC) oversight. As stated above, this Site was referred to EPA Region 6 ERB in March of 1993 by the FDIC for any further investigation or actions deemed necessary by the EPA.

After reviewing post-removal sampling data furnished by the FDIC, it became apparent to EPA that significant levels of contamination were still present on-site. In April 1993, the TAT was tasked to conduct an extent of contamination survey on the Site. This survey documented the vertical and horizontal extent of contamination in and around the historic wood preservation area, the adjacent trailer park and Katy Independent School District properties, and the surface water run-off pathways. The results of this survey are discussed in Section III, A and B of this Action Memorandum.

2. Current actions

On June 4, 1993, Russell F. Rhoades, Director of the Environmental Services Division, granted verbal approval for the ERB to conduct a classic emergency removal action on the Site to address the threats posed by this Site to the general public health and/or the environment. Initial removal activities began on June 7, 1993 and ended on July 20, 1993. Activities undertaken during this period are outlined in Section V, A of this Memorandum. Currently, ERB is monitoring the status of the interim on-site waste storage facility pending arrangements for final destruction of the contaminated materials.

C. State and Local Authorities' Roles

1. State and local actions to date

As stated earlier, the TWC oversaw and certified clean closure on two underground petroleum storage tanks present on Site. There is no evidence that TWC had any other involvement with the hazardous materials removal conducted by the FDIC in the wood treating area.





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2. Potential for continued state and local response

Due to the exigency of the threat to the general public health and welfare posed by this Site, the ERB initiated an emergency action without contacting the TWC about its ability to respond to this Site in a timely manner. Also, it appears that none of the county or municipal entities would be able respond to the threats posed by this Site in a timely manner.

## III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES:

### A. Threats to Public Health or Welfare

The predominant threat to the public health and welfare posed by this Site are direct exposure, including inhalation and ingestion, to soils contaminated with pentachlorophenol and the associated chlorinated phenol by-products, specifically CDDs/CDFs. As aforementioned, these contaminants were historically discharged into the surface soils in and around the wood treatment area and adjacent residential property.

Although pentachlorophenol is a hazardous/toxic material and a suspected carcinogen, the main threat to the public health and welfare on this Site arises from the CDDs and CDFs associated with the pentachlorophenol. For the purposes of risk assessment associated with these chemicals, samples are analyzed for the 2,3,7,8 isomers of the CDDs and CDFs using EPA Method 8280. After the concentrations of the 2,3,7,8 isomers are established, a toxicity equivalence is calculated for the 2,3,7,8 isomer of tetrachlorodibenzo-p-dioxin (2,3,7,8 TCDD) using the procedures outlined in EPA publication 625/3-89/016, "Interim Procedures for Estimating Risks Associated with Exposure to Mixtures of CDDs and CDFs." The 2,3,7,8 isomer of TCDD is generally considered to be one of the most toxic chemicals known and has been used since the early 1980s as the bench mark (actual concentration or equivalents) for CDD/CDF contaminated sites. The current action levels used by the Agency for CDD/CDF contaminated sites are: 1 part per billion (ppb) 2,3,7,8 TCDD (actual or equivalents) for residential sites and 10 ppb 2,3,7,8 TCDD for industrial sites. The 2,3,7,8 TCDD equivalents for soil samples collected by the TAT from the contaminated areas at the facility ranged from 14.9 to 66.3 ppb. The 2,3,7,8 TCDD equivalents for the soil samples collected from the contaminated run-off areas in the adjacent Pin Oak Trailer Park ranged from 5.0 to 66.3 ppb. These aforementioned concentrations of 2,3,7,8 TCDD far exceed the established actionable levels for these chemicals and potentially expose the residents of the trailer park and any transient human activity, both on and off-site, to unacceptable levels of these chemicals.

The threats on this Site to the general public health and welfare are consistent with and meet the requirements for initiating a removal action as outlined in Section 300.415(b)(2) of the NCP.

B. Threats to the Environment

The environmental media affected by this Site are the soil and surface water from the historic and/or current uncontrolled releases and through localized rain water run-off from the Site.

## IV. ENDANGERMENT DETERMINATION

Actual or threatened releases of hazardous substances or pollutants or contaminants from this Site, if not addressed by implementing the response action selected in this Action Memorandum, may present an imminent and substantial endangerment to public health, welfare, or the environment.

## V. PROPOSED ACTIONS AND ESTIMATED COSTS

### A. Proposed Actions

The proposed actions involve the excavation, containerization and secure interim on-site storage of the pentachlorophenol and associated chlorophenol wastes on the Site. These wastes will be stored on-site until arrangements can be made for their final destruction. The proposed action will also address 11 drums of RCRA characteristic waste that have been stored on the Site during the aforementioned FDIC abatement activities. The drums will be consolidated (where possible) and segregated by RCRA regulatory characterization prior to disposal in an appropriate off-site disposal facility.

#### 1. Proposed Action Description

All of the actions to be taken on-site during this removal are compliant with all applicable ARARs to the extent practicable, considering the exigencies of the situation, and provide an effective mitigation of the imminent and substantial threats posed to the general public health and environment by the Site.

Approximately 350,000 pounds (@ 150 cubic yards) of contaminated soil are expected to be removed from the areas of contamination, both on and off-Site. Upon excavation, the contaminated material will be placed in a Department of Transportation (DOT)-approved 17E open top 55 gallon steel drum and transported within the confines of the Site to the secure interim storage facility. In addition to the excavated soil, any decontamination solutions, PPE, or other wastes generated during this action that can not be safely disposed by any other means will be stored in an appropriate DOT approved container in the storage facility.

In order to meet the substantive requirements of the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. § 6901 et. seq., that apply to the storage of hazardous wastes at interim status facilities, 40 C.F.R. Part 264, several modifications will be made to one of the existing buildings on Site. The building chosen for modification is of I-beam and sheet metal construction with a concrete floor. Modifications to the building prior to storage of the containerized waste will include: sealing of the floor with a chemical resistant industrial epoxy sealant; erection of a concrete berm inside the structure; enclosing the openings on either end of the building with sheet metal panels and/or a sheet metal door; the erection of chain link security fencing both inside and outside of the storage building and the attachment of warning signs.

Disposal of hazardous substances, pollutants, or contaminants generated during this action will be in accordance with EPA's Off-Site Disposal Policy, promulgated pursuant to Section 121(d)(3) of CERCLA, 42 U.S.C. § 9621(d)(3), as implemented by OSWER Directive 9834.11 (November 13, 1987).

Other requirements under the Occupational Safety and Health Act (OSHA) of 1970, 29 U.S.C. § 651 et. seq., and under the laws of States with plans approved under section 18 of the State's OSHA laws, as well as other applicable safety and health requirements, will be followed. Federal OSHA requirements include, among other things, Hazardous Materials Operation, 20 C.F.R. Part 1910, as amended by 54 Fed. Reg. 9317 (March 5, 1989), all OSHA General Industry (29 C.F.R. Part 1910) and Construction (29 C.F.R. Part 1926) standards wherever they are relevant, as well as OSHA recordkeeping and reporting regulations, the EPA regulations set forth in 40 C.F.R. Part 300, and other EPA policies/guidelines relating to the conduct of work at Superfund sites.

**2. Contribution to remedial performance**

All actions proposed for this Site are cost effective and consistent with any long term remediation strategies that may be developed for the Site.

**3. Description of alternative technologies**

Due to the exigencies of the conditions on Site, the only alternative deemed to be appropriate was the excavation and secure interim on-site storage of the pentachlorophenol and associated dioxin wastes associated with the Site. However, in order to be consistent with the goals of the Agency, ERB will try to attain final destruction of this material at the APTUS facility in Coffeyville, KS. Since this facility is the only approved commercial "dioxin" waste incinerator in the United States, a statutory waiver request memorandum may have to be prepared before

the material can be finally destroyed, due to the projected lengthy waiting list to get material into the facility.

The 11 drums of RCRA characteristic waste on Site will be sent to an alternative use (fuels blending) facility for final destruction.

## 4. ARARs

This removal action will be conducted to eliminate the actual or potential release of a hazardous substance, pollutant, or contaminant to the environment, pursuant to CERCLA, 42 U.S.C. § 9601 et. seq., and in a manner consistent with the National Contingency Plan, 40 C.F.R. Part 300, as required at 33 U.S.C. § 1321(c)(2) and 42 U.S.C. § 9605.

As per 40 C.F.R. Part 300.415(i), fund-financed removal actions under CERCLA § 104 and removal actions pursuant to CERCLA § 106 shall, to the extent practicable considering the exigencies of the situation, attain the applicable or relevant and appropriate requirements under Federal environmental law.

## 5. Project schedule

This classic emergency removal action is anticipated to begin in the last part of the third quarter of fiscal 1993 and be completed by early fourth quarter.





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B. Estimated Costs

| | Project Ceiling |
|---|---|
| **Extramural Costs:** | |
| Cleanup Contractor Costs | $ 250,000 |
| Total TAT costs | |
| Total NCLP | $ 100,000 |
| Total REAC | $ 0 |
| | $ 0 |
| Subtotal, Extramural Costs | $ 350,000 |
| Extramural Costs Contingency | $ 70,000 |
| **TOTAL, EXTRAMURAL COSTS** | $ 420,000 |
| **Intramural Costs:** | |
| Intramural Direct Costs | $ 30,000 |
| Intramural Indirect Costs | $ 60,000 |
| **TOTAL, INTRAMURAL COSTS** | $ 90,000 |
| **TOTAL, PROJECT CEILING** | $ 610,000 |

## VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Should no action be taken, the Site will continue to deteriorate and continue to pose a significant potential public health risk to the residents of the area through direct contact to the waste on and off the Site.

## VII. OUTSTANDING POLICY ISSUES

There are no outstanding policy issues associated with this removal action.

## VIII. ENFORCEMENT

See attached Enforcement Addendum.





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## IX. RECOMMENDATION

This decision document represents the selected removal action for the Johnson Lumber Site, in Katy, Fort Bend County, Texas, developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended, 42 U.S.C. §9601 et. seq., and not inconsistent with the National Contingency Plan (NCP), 40 C.F.R. Part 300. This decision is based on the Administrative Record for the site.

Conditions at the site meet the NCP § 300.415(b)(2) criteria for a removal, and I recommend your approval of the proposed removal action. The total project ceiling, if approved, will be $610,000. Of this, an estimated $250,000 comes from the Regional Allowance for the ERCS contractor. You may indicate your approval by signing the appropriate space below.

Approved _____ Date 11/18/93

Disapproved _____ Date _____





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Federal Deposit Insurance Corporation
1910 Pacific Avenue, Suite 1100, Dallas, 75201
(214) 220-3300 (FAX) 220-3478
Dallas Regional Office-Legal

March 26, 1993

Mr. James Mullins, 6E-EI
U.S Environmental Protection Agency
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

RE: Johnson Lumberyard, Katy, Texas

Dear Mr. Mullins:

Thank you for taking the time to meet with us on March 23, 1993, to discuss the Johnson Lumberyard site. FDIC is concerned with the potential threat to public health and safety associated with pentachlorophenol contamination from past wood treatment activities on the site. Our concern is heightened, of course, because the site is adjoined by an active mobile home park and a school playground. As we discussed, because the FDIC is entitled to the "involuntary acquisition defense," the FDIC is referring the site to EPA for further investigation and action.

I have provided as Attachments "A","B","C" and "D", respectively,the following documents which describe conditions at the site:

1. May 12, 1990 report by Rhone Engineers, Inc. "Level I Environmental Site Assessment" (relating to total property);

2. September 30, 1991 "Comprehensive Site Assessment" report by Corrigan Consulting, Inc. (relating to UST removal and remediation on the property);

3. December 30, 1991 "Comprehensive Site Assessment" report by Corrigan Consulting, Inc. (relating to UST removal and remediation on the property); and

4. January 6, 1992 "Results of Site Investigation" report by Groundwater Services, Inc. (relating to the wood treatment areas on the property).

I have also provided, as Attachment "E," a summary of the "Chain Of Title" information for the property. As we discussed, the FDIC involuntarily acquired the property on May 4, 1989, when Katy National Bank became insolvent and was closed by the Comptroller of the Currency. Katy National Bank had foreclosed its Deed of Trust Lien from H.L. Johnson Lumber Company, Inc. on July 5, 1988.

Finally, I have enclosed as attachment "F," a copy of the manifest and waste profiles for the stored materials by Technical Environmental Systems, Inc. ("TES"). As you know, in July 1990 the FDIC acted voluntarily to abate immediate threats to public health and safety. At that time, approximately 93 drums were removed and transported to the TES storage facility in LaPorte, Texas.

By this letter, FDIC agrees to provide EPA and its contractors access to the Johnson Lumberyard site, and to allow it to conduct appropriate investigative and removal or remediation activities. Please contact me to arrange access to the property.

Please do not hesitate to call me at 214/220-3353 if you have any questions or require further information.

Very truly yours,

Kerschiel D. Smith
Attorney for the FDIC

cc: John Dugdale, Esq. w/o attachments
Environmental Protection Agency, Region 6

H. Glenn Hall, III, Esq. w/o attachments
Texas Water Commission



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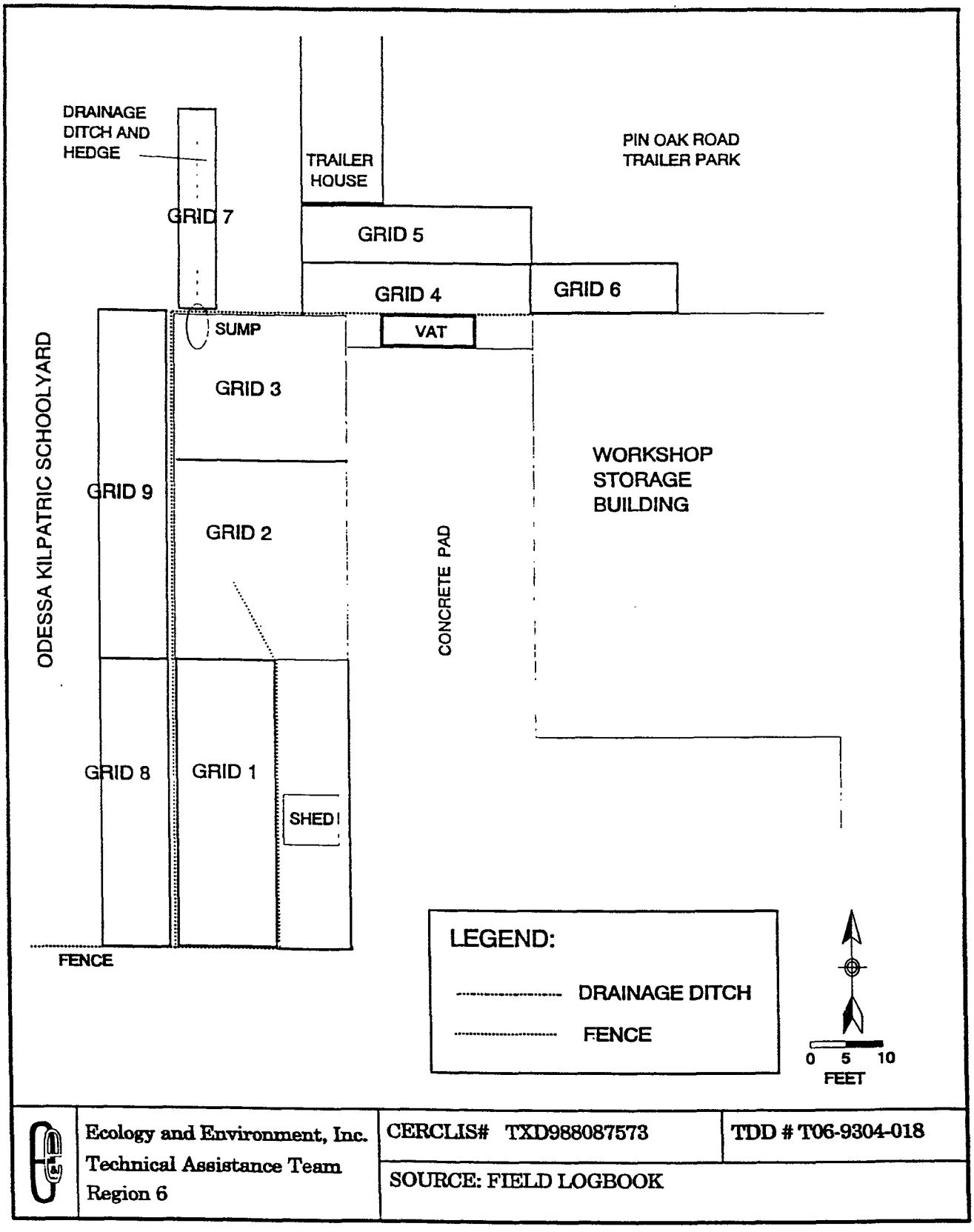


| | | |
|---|---|---|
| Ecology and Environment, Inc.<br>Technical Assistance Team<br>Region 6 | CERCLIS# TXD988087573 | TDD # T06-9304-018 |
| | SOURCE: FIELD LOGBOOK | |

SAMPLE GRID LOCATION MAP
WOOD TREATMENT AREA
JOHNSON LUMBERYARD SITE
KATY, FORT BEND COUNTY, TEXAS

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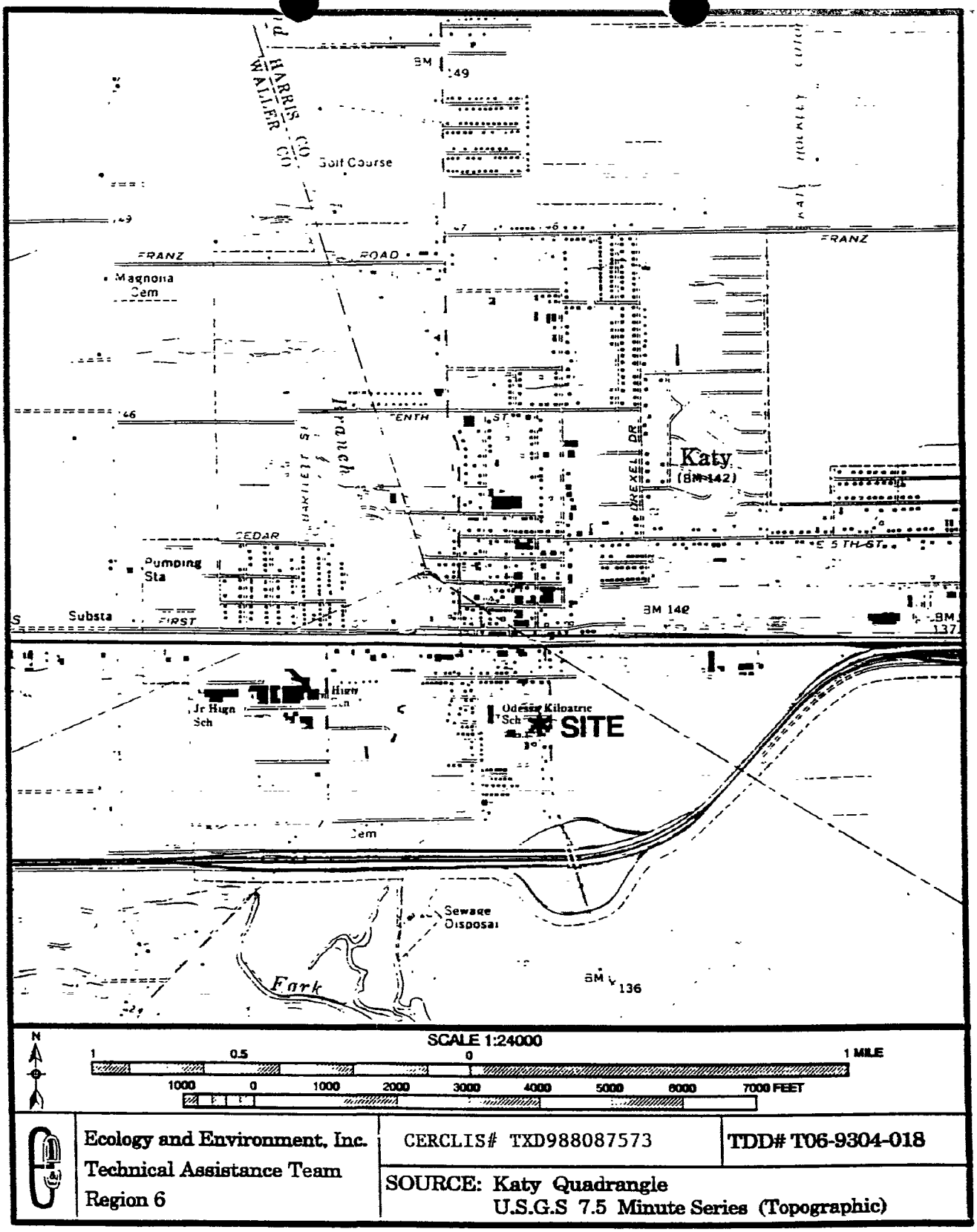


| | | |
|---|---|---|
| Ecology and Environment, Inc.<br>Technical Assistance Team<br>Region 6 | CERCLIS# TXD988087573 | TDD# T06-9304-018 |
| | SOURCE: Katy Quadrangle<br>U.S.G.S 7.5 Minute Series (Topographic) | |

SITE LOCATION MAP
JOHNSON LUMBERYARD SITE
KATY, FORT BEND CO., TEXAS

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SUMMARY OF PCDD/PCDF ANALYSIS FROM JOHNSON LUMBERYARD SITE

| SAMPLE G3-D | CONCENTRATION (PPB) | | | |
|---|---|---|---|---|
| ANALYTE | GRID 3 HIGH END | GRID 3 LOW END | TEF | TEF-ADJUSTED CONC. (PPB) |
| 2,3,7,8-TCDD | ND | ND | 1 | ND |
| 1,2,3,7,8-PeCDD | 3.19 | 3.19 | 0.5 | 1.6 |
| 1,2,3,4,7,8-HxCDD | 7.8 | 7.8 | 0.1 | 0.78 |
| 1,2,3,6,7,8-HxCDD | 22.7 | 22.7 | 0.1 | 2.3 |
| 1,2,3,7,8,9-HxCDD | 16.1 | 16.1 | 0.1 | 1.6 |
| 1,2,3,46,7,8-HpCDD | 123 | 123 | 0.01 | 1.2 |
| OCDD | 408 | 408 | 0.001 | 0.41 |
| 2,3,7,8-TCDF | 0.166(J) | 0.166(J) | 0.1 | 0.017 |
| 1,2,3,7,8-PeCDF | 1.44 | 1.44 | 0.05 | 0.072 |
| 2,3,4,7,8-PeCDF | 1.45 | 1.45 | 0.5 | 0.73 |
| 1,2,3,4,7,8-HXCDF | 6.78(E) | 6.78(E) | 0.1 | 0.68 |
| 1,2,3,6,7,8-HxCDD | 43.4 | 43.4 | 0.1 | 4.3 |
| 2,3,4,6,7,8-HxCDF | 2.93 | 2.93 | 0.1 | 0.29 |
| 1,2,3,7,8,9-HxCDF | 1.08(J) | 1.08(J) | 0.1 | 0.11 |
| 1,2,3,4,6,7,8-HpCDF | 69.7(E) | 30.1(J) | 0.01 | 0.7-0.3 |
| 1,2,3,4,7,8,9-HpCDF | 9.41 | 9.41 | 0.01 | 0.094 |
| OCDF | 377(E) | 377(E) | 0.001 | 0.38 |
| TOTAL 2,3,7,8-TCDD (1989) EQUIVALENTS: | | | | 15.3-14.9 |

| SAMPLE GP-3 | CONCENTRATION (PPB) | | | |
|---|---|---|---|---|
| ANALYTE | 3-4 FT HIGH END | 3-4 FT LOW END | TEF | TEF-ADJUSTED CONC. (PPB) |
| 2,3,7,8-TCDD | ND | ND | 1 | ND |
| 1,2,3,7,8-PeCDD | ND | ND | 0.5 | ND |
| 1,2,3,4,7,8-HxCDD | 0.543 | 0.543 | 0.1 | 0.054 |
| 1,2,3,6,7,8-HxCDD | 2.27(J) | 2.27 (J) | 0.1 | 0.23 |
| 1,2,3,7,8,9-HxCDD | ND | ND | 0.1 | ND |
| 1,2,3,46,7,8-HpCDD | 51.8 | 51.8 | 0.01 | 0.52 |
| OCDD | 196 | 196 | 0.001 | 0.2 |
| 2,3,7,8-TCDF | ND | ND | 0.1 | ND |
| 1,2,3,7,8-PeCDF | ND | ND | 0.05 | ND |
| 2,3,4,7,8-PeCDF | ND | ND | 0.5 | ND |
| 1,2,3,4,7,8-HXCDF | 0.568 (J) | 0.568 (J) | 0.1 | 0.057 |
| 1,2,3,6,7,8-HxCDD | 6.1 | 6.1 | 0.1 | 0.61 |
| 2,3,4,6,7,8-HxCDF | ND | ND | 0.1 | ND |
| 1,2,3,7,8,9-HxCDF | ND | ND | 0.1 | ND |
| 1,2,3,4,6,7,8-HpCDF | 7.26 | 7.26 | 0.01 | 0.073 |
| 1,2,3,4,7,8,9-HpCDF | ND | ND | 0.01 | ND |
| OCDF | 23.1 | 23.1 | 0.001 | 0.023 |
| TOTAL 2,3,7,8-TCDD (1989) EQUIVALENTS: | | | | 1.77 |

| SAMPLE G4-D | CONCENTRATION (PPB) | | | |
|---|---|---|---|---|
| ANALYTE | GRID 4 HIGH END | GRID 4 LOW END | TEF | TEF-ADJUSTED CONC. (PPB) |
| 2,3,7,8-TCDD | 0.249 (J) | 0.249 (J) | 1 | 0.25 |
| 1,2,3,7,8-PeCDD | 16.6 (E) | 16.6 (E) | 0.5 | 8.3 |
| 1,2,3,4,7,8-HxCDD | 41.2 (E) | 14.7 (J) | 4.1 | 1.5 |
| 1,2,3,6,7,8-HxCDD | 116 (E) | 62.6 (J) | 0.1 | 12 - 6.3 |
| 1,2,3,7,8,9-HxCDD | 90.8 (E) | 37 (J) | 0.1 | 9.1 - 3.7 |
| 1,2,3,46,7,8-HpCDD | 936 | 936 | 0.01 | 9.4 |
| OCDD | 687 | 687 | 0.001 | 0.69 |
| 2,3,7,8-TCDF | 0.603 (J) | 0.603 (J) | 0.1 | 0.6 |
| 1,2,3,7,8-PeCDF | 9.29 | 9.29 | 0.05 | 0.46 |
| 2,3,4,7,8-PeCDF | 6.12 | 6.12 | 0.5 | 3.1 |
| 1,2,3,4,7,8-HXCDF | 39.8 (E) | 13.6 (J) | 0.1 | 4 - 1.4 |
| 1,2,3,6,7,8-HxCDD | 105 | 105 | 0.1 | 10.5 |
| 2,3,4,6,7,8-HxCDF | 14.2 | 14.2 | 0.1 | 1.4 |
| 1,2,3,7,8,9-HxCDF | 6.64 | 6.64 | 0.1 | 0.66 |
| 1,2,3,4,6,7,8-HpCDF | 126 | 126 | 0.01 | 1.3 |
| 1,2,3,4,7,8,9-HpCDF | 46.2 (E) | 8.64 (J) | 0.01 | 0.46 - 0.09 |
| OCDF | 184 | 184 | 0.001 | 0.18 |
| TOTAL 2,3,7,8-TCDD (1989) EQUIVALENTS: | | | | 66.3 - 52.4 |

| SAMPLE G5-D | CONCENTRATION (PPB) | | | |
|---|---|---|---|---|
| ANALYTE | GRID 5 HIGH END | GRID 5 LOW END | TEF | TEF-ADJUSTED CONC. (PPB) |
| 2,3,7,8-TCDD | ND | ND | 1 | ND |
| 1,2,3,7,8-PeCDD | 1.85 | 1.85 | 0.5 | 0.93 |
| 1,2,3,4,7,8-HxCDD | ND | ND | 4.1 | ND |
| 1,2,3,6,7,8-HxCDD | 13 | 13 | 0.1 | 1.3 |
| 1,2,3,7,8,9-HxCDD | ND | ND | 0.1 | ND |
| 1,2,3,46,7,8-HpCDD | 200 (E) | 24.7 (J) | 0.01 | 2 - 0.25 |
| OCDD | 565 (E) | 193 (J) | 0.001 | 0.57 - 0.19 |
| 2,3,7,8-TCDF | 0.103 (J) | 0.103 (J) | 0.1 | 0.01 |
| 1,2,3,7,8-PeCDF | 0.693 (J) | 0.693 (J) | 0.05 | 0.035 |
| 2,3,4,7,8-PeCDF | 0.754 (J) | 0.754 (J) | 0.5 | 0.38 |
| 1,2,3,4,7,8-HXCDF | 2.68 | 2.68 | 0.1 | 0.27 |
| 1,2,3,6,7,8-HxCDD | 13.2 | 13.2 | 0.1 | 1.3 |
| 2,3,4,6,7,8-HxCDF | 1 (J) | 1 (J) | 0.1 | 0.1 |
| 1,2,3,7,8,9-HxCDF | 0.228 (J) | 0.228 (J) | 0.1 | 0.023 |
| 1,2,3,4,6,7,8-HpCDF | 23.8 | 23.8 | 0.01 | 0.24 |
| 1,2,3,4,7,8,9-HpCDF | 1.3 (J) | 1.3 (J) | 0.01 | 0.013 |
| OCDF | 33.7 | 33.7 | 0.001 | 0.034 |
| TOTAL 2,3,7,8-TCDD (1989) EQUIVALENTS: | | | | 7.2 - 5.0 |

FLAGS
(X) INTERFERENCE PEAK MAY OBSCURE DETECTABLE PEAKS
(E) CONC. EXCEEDED CALIBRATED RANGE
(J) CONC. BETWEEN CALIBRATED RANGE AND DETECTION LIMIT
ND NOT DETECTED

TEF = TOXICITY EQUIVALENCE FACTOR



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